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# Global COVID-19 Research Networks: Collaboration and Authorship Trends (2024–2025)

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***Abstract:*** ***The COVID-19 pandemic has triggered profound and unprecedented changes across nearly all facets of daily life, exposing what may be one of the most significant global crises in modern history. In response to this disruption, this study seeks to offer thematic and methodological insights for the development of sustainable research agendas. It does so through a comprehensive bibliometric analysis of scholarly publications that focus on the domains of management, leadership, and administration in the context of the COVID-19 pandemic. This study investigates authorship patterns and collaborative research in COVID-19 literature, based on an analysis of 10,572 research papers published between 2024 and 2025. Data were sourced from the Scopus database and analyzed using Microsoft Excel. The findings reveal a strong trend toward multi-authored publications, reflecting the highly collaborative nature of pandemic-related research. This widespread cooperation was driven by the global scope, complexity, and urgency of the health crisis. Despite the overall dominance of collaborative work, single-author contributions were also notable in terms of productivity patterns. These results highlight the critical role of interdisciplinary and inter-institutional collaboration in advancing scientific knowledge during a public health emergency and offer valuable insights into evolving trends in research authorship and productivity.***

***Keywords: Authorship pattern, COVID-19, Coronavirus, Bibliometric analysis.***

## I. INTRODUCTION

Authorship patterns and productivity serve as essential metrics in bibliometric and citation analysis, providing valuable insights into the framework and dynamics of academic communication. Examining authorship patterns helps in understanding the traits of researchers, the nature of their collaborations, and the overall development of a research domain. These studies illuminate both personal and institutional roles and act as essential instruments for evaluating and tracking research efforts, effects, and scientific impact. (Lin et al., 2026) In the scenario of a worldwide health emergency such as COVID-19, analyzing authorship and output gains notable importance. The pandemic triggered an unprecedented surge in scientific output, characterised by rapid publication, interdisciplinary research, and extensive global collaboration. Examining authorship trends and research output during this period enables us to understand how the scientific community responded to address a pressing and complex public health issue. This research aims to examine these trends in COVID-19 literature, offering insightful perspectives on academic conduct, collaborative networks, and citation influence during the 2020–2025 timeframe.(Aryani et al., 2025)

## II. REVIEW OF LITERATURE

Elango and Rajendran, in their 2012 study, analyze authorship trends and collaboration patterns in marine science literature. The data were sourced from the *Indian Journal of Marine Sciences* covering the publication period from 2001 to 2010. Scientometric indicators such as the collaboration index, collaboration coefficient, and dominance factor were employed to assess the extent and nature of collaborative research within this field. The study offers valuable insights into how scientific authorship and collaboration have evolved over a decade in marine science research.(B & Rajendran, 2012)

El Mohadab, Bouikhalene, and Safi, in this 2020 study, apply bibliometric methods to analyze and map the global state of scientific research on COVID-19. Using data from international scientific databases, the study explores publication trends, authorship patterns, research productivity, and key thematic areas. Advanced bibliometric tools and visualization techniques—such as co-citation analysis, co-word analysis, and network mapping—are used to identify dominant research themes, collaborative networks, and the evolution of scientific output related to the pandemic. The study serves as a foundational reference for understanding the trajectory and scope of COVID-19 research, and it provides methodological insights for future large-scale bibliometric analyses.(El Mohadab et al., 2020)

Liu, Yin, and Liu (2021) conduct an in-depth bibliometric analysis to map the landscape of global scientific collaboration in COVID-19 research. The study evaluates authorship networks, journal dissemination, institutional affiliations, and country-level

 

collaborations using data sourced from the Web of Science database. Key metrics such as publication volume, co-authorship patterns, and international partnerships are analyzed to reveal the structural dynamics of global research activity during the pandemic. The findings underscore the central role played by countries like the United States, China, and the United Kingdom in driving collaborative research efforts and highlight the rapid and coordinated international response to the COVID-19 crisis.(Dehghanbanadaki et al., 2020) Vaishali Khaparde (2011) investigates the authorship pattern and degree of collaboration in the field of Information Technology by analyzing research articles published in the *Journal of Computer Science and Engineering*. The study examines the number of single- and multi-authored papers, calculates the degree of collaboration, and explores the trend of co-authorship over time. Using bibliometric techniques, the study reveals a growing inclination toward collaborative research in the IT field, with multi-authored papers dominating the publication landscape. The findings highlight the importance of teamwork and interdisciplinary cooperation in advancing technological research.(Khaparde, 2013)

### A. *Objectives of the Study*

1) To examine the development and publication patterns of COVID-19-related studies from 2020 to 2025 in the Scopus database.
2) To determine the most productive authors, institutions, and nations involved in COVID-19 research throughout the study timeframe.
3) To investigate the fields and topics that are most involved in releasing studies related to COVID-19.
4) To evaluate patterns of research collaboration, such as co-authorship and global partnerships in COVID-19 research.
5) To identify the articles, journals, and keywords most commonly referenced in COVID-19 research.
6) To investigate thematic development and new trends in COVID-19 studies via keyword and content analysis.
7) To assess how COVID-19 research output affects the spread of scientific knowledge and the worldwide public health response

### B. *Scope and Limitations of the Study*

This study aims to provide a comprehensive bibliometric analysis of COVID-19-related research conducted in India during the years 2024 and 2025. The scope of the study is defined as follows:

1) Temporal Scope: Focused exclusively on publications from January 2024 to December 2025.
2) Geographic Scope: Limited to research affiliated with Indian authors and institutions, including both national and internationally collaborative publications.
3) Topical Scope: Includes all scholarly outputs related to COVID-19, such as public health interventions, vaccine development, epidemiology, diagnostics, clinical management, mental health, and long-COVID studies.
4) Data Source: The data was exclusively extracted from the Scopus database, a multidisciplinary indexing platform recognized for its comprehensive coverage of peer-reviewed literature.
5) Bibliometric Parameters: The study evaluates patterns in authorship, document types, top contributors, institutional affiliations, collaboration networks, and publication trends

## III. METHODOLOGY

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## IV. DATA COLLECTION

The data for the present study were retrieved from Scopus, a leading international, multidisciplinary bibliographic database. To ensure comprehensive coverage of relevant literature, the following search strategy was employed, targeting the combined fields of Title, Abstract, and Keywords (TITLE-ABS-KEY):

TITLE-ABS-KEY (“COVID-19” OR “COVID19” OR “2019-nCoV” OR “2019 novel coronavirus” OR “SARS-CoV-2” OR “severe acute respiratory syndrome coronavirus 2” OR “novel coronavirus” OR “nCoV-2019” OR “coronavirus disease 2019”) AND PUBYEAR >2019 AND PUBYEAR<2026 AND PUBYEAR>2023 AND PUBYEAR<2026 AND (LIMIT-TO (AFFILCOUNTRY, “India”)) Data Analysis

A total of 10,572 documents found till 15 June 2025

### *A. Data Analysis*

Data analysis is a critical component of any scholarly investigation, aiming to transform extensive raw data into structured and meaningful insights. In this study, a total of 10,572 articles related to COVID-19 research, indexed in the Scopus database between 2024 and 2025, were systematically analysed.

The analysis was conducted using a variety of bibliometric parameters to ensure comprehensive coverage and relevance. These included:

- Identification and ranking of core journals based on publication output and relevance to the field.
- Ranking of authors to determine the most productive contributors during the study period.
- Geographical distribution of publications, highlighting the leading countries and regions in terms of research output.
- Year-wise distribution to track publication trends over the two-year span.
- Form-wise distribution (e.g., articles, reviews, conference papers) to understand the preferred formats of scholarly communication.
- Language-wise distribution to assess the linguistic reach of COVID-19 literature.

The data has been meticulously organised and visualised through tables and graphical representations (bar graphs, pie charts, and trend lines) to enhance interpretability and highlight key patterns. This analytical approach offers a clear and concise overview of the global research landscape on COVID-19 for 2024 and 2025, with a focus on collaboration, productivity, and publication trends.

| No.of authors | No.of papers | Percentage |
|---|---|---|
| Single author | 17 | 1.7 |
| Two author | 169 | 16.9 |
| Three author | 147 | 14.7 |
| Four author | 170 | 17% |
| Five author | 132 | 13.2 |
| Six author | 91 | 9.1 |
| Seven author | 50 | 5.0 |
| Eight author | 37 | 3.7 |
| Nine author | 35 | 3.5 |
| Ten author | 21 | 2.1 |
| Eleven author | 19 | 1.9 |
| Twelve author | 17 | 1.7 |
| Thirteen author | 16 | 1.6 |
| Fourteen author | 6 | 0.6 |
| Fifteen author | 8 | 0.8 |
| Between 16-50 authors | 43 | 4.3 |
| Between 51-100 authors | 6 | 0.6 |
| Between 101-150 author | 1 | 0.1 |
| More than 150 author | 15 | 1.5 |
| Total | 1000 | |

Table:1

In this table, a total of 1,000 articles were selected for analysis based on their high citation counts, which serve as an indicator of their academic impact and relevance within the research community. Table No. 1 shows that out of 1000 contributions, 17 (1.7%) have been contributed by a single author, 169 (16.9%) by two authors, 147 (14.7%) by three authors & 170 (17%) by four authors.

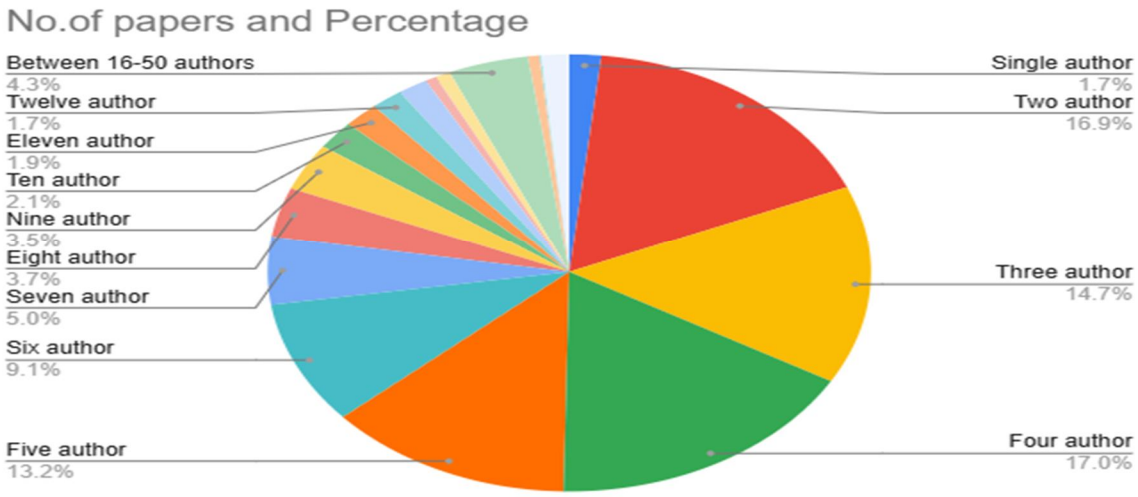



Fig:1

*B. Degree of Collaboration*

The degree of collaboration among authors is a vital indicator of research dynamics and teamwork within the scientific community. In the present study, the degree of collaboration was calculated using the formula proposed by Subramanyam (1983):

C = Nm / (Nm + Ns)

Where:

*C* = Degree of collaboration

*Nm* = Number of multi-authored papers

*Ns* = Number of single-authored papers

Out of the 1,000 articles analyzed, 17 were single-authored (Ns) and 983 were multi-authored (Nm).(Kumar & Verma, 2021) Using the formula:

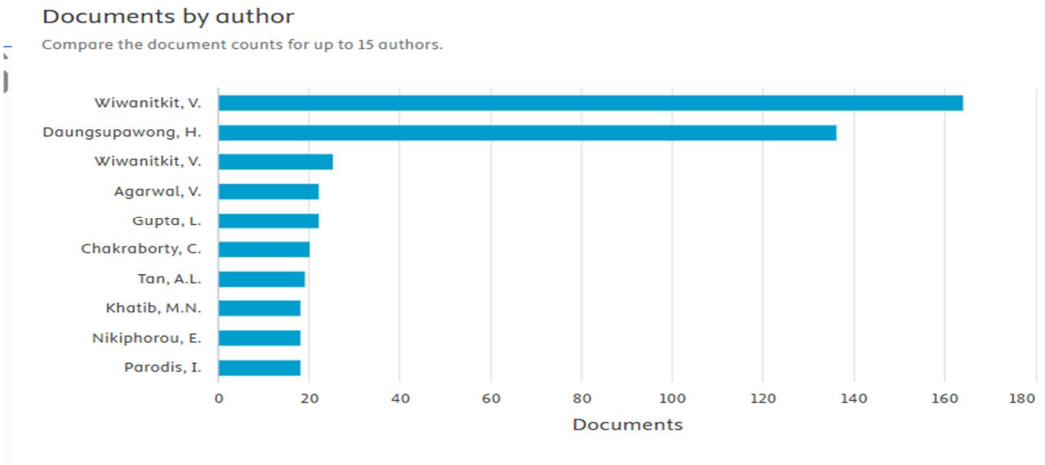
C = 983 / (983 + 17) = 0.983

The resulting degree of collaboration is 0.983, which indicates a very high level of collaborative authorship in COVID-19 research. This reflects the multidisciplinary nature of pandemic-related studies and the necessity for researchers across various fields and institutions to work collectively in addressing complex global health challenges

Most top ten Productive Authors

The most prolific authors during this period were affiliated with global research hubs such as:

| Sr.No. | Name of author | Publications | Citations | h-index |
|---|---|---|---|---|
| 1. | Wiwanitkit,V. | 164 | 31 | 2 |
| 2. | Daungsupawong,H. | 136 | 28 | 2 |
| 3. | Wiwanit,V. | 25 | 2 | 1 |
| 4. | Agarwal,V. | 22 | 42 | 3 |
| 5. | Gupta,L | 22 | 56 | 3 |
| 6. | Chakraborty,C. | 20 | 2416 | 6 |
| 7. | Tan,A.L. | 19 | 41 | 3 |
| 8. | Khatib,M.N. | 18 | 1957 | 8 |
| 9. | Nikiphorou,E. | 18 | 39 | 3 |
| 10. | Parodis,I. | 18 | 38 | 3 |

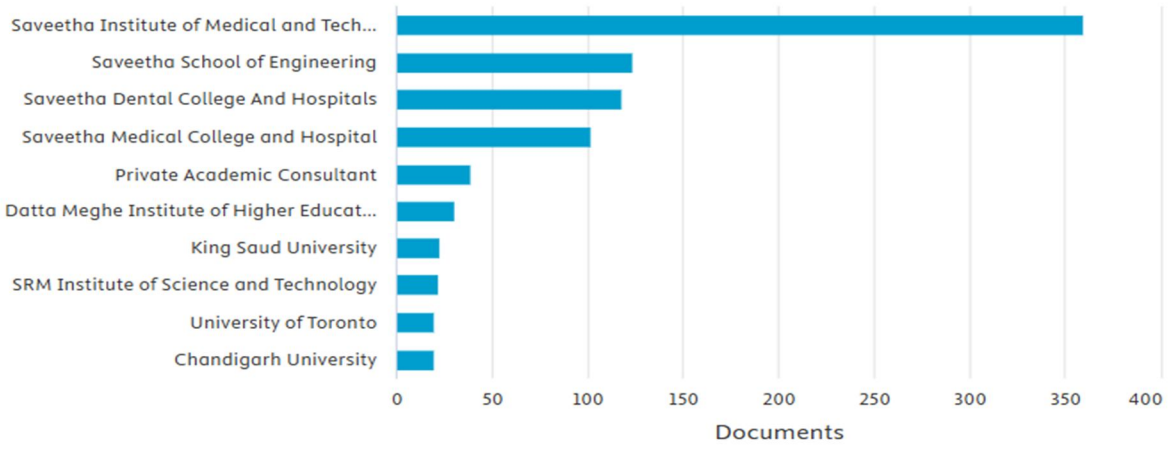



These authors have played significant roles in high-impact areas, including vaccine development, viral mutations, and long COVID research.

### *C. Institutional Collaboration*

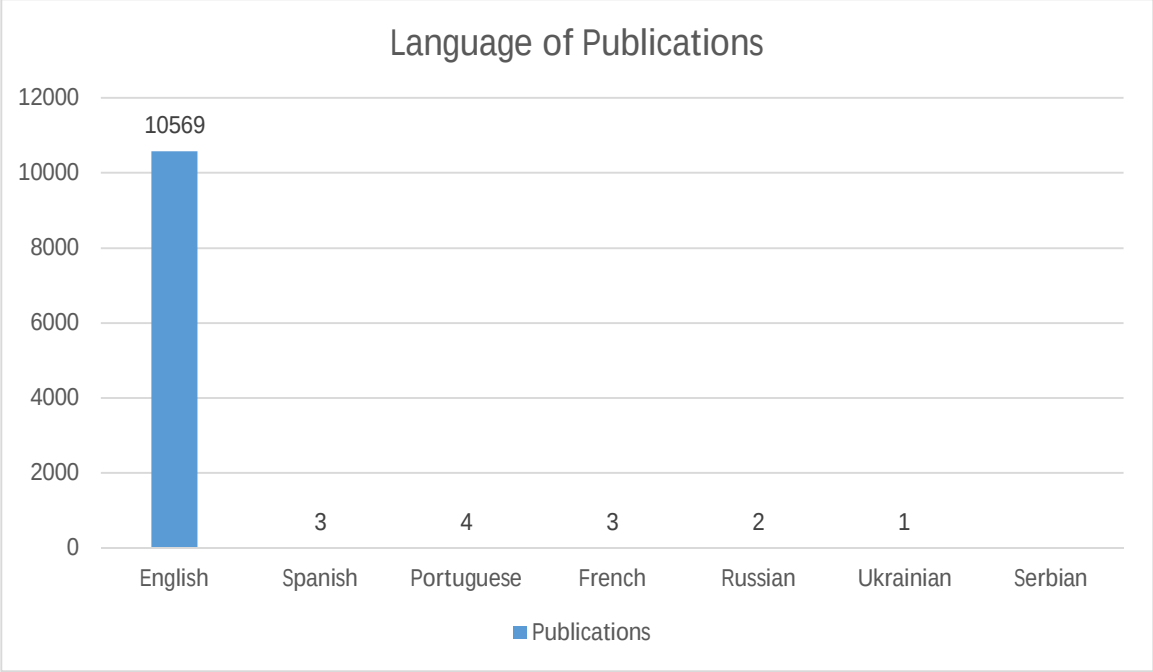
Top Ten documents by affiliation(INDIA)

| Sr.No. | Name of Institution | Total Publications |
|---|---|---|
| 1. | Saveetha Institute of Medical & Technical Sciences | 359 |
| 2. | Amity University | 223 |
| 3. | Chandigarh University | 214 |
| 4. | University of Delhi | 203 |
| 5. | Manipal Academy of Higher Education | 186 |
| 6. | All India Institute of Medical Sciences,New Delhi | 183 |
| 7. | SRM Institute of Science | 182 |
| 8. | Vellore Institute of Technology | 176 |
| 9. | Symbiosis International deemed university | 163 |
| 10. | Lovely Professional University | 161 |



*D. Language-wise Distribution of Articles*

| | |
|---|---|
| English | 10,569 |
| Spanish | 3 |
| Portuguese | 4 |
| French | 3 |
| Russian | 2 |
| Ukrainian | 1 |
| Serbian | 1 |



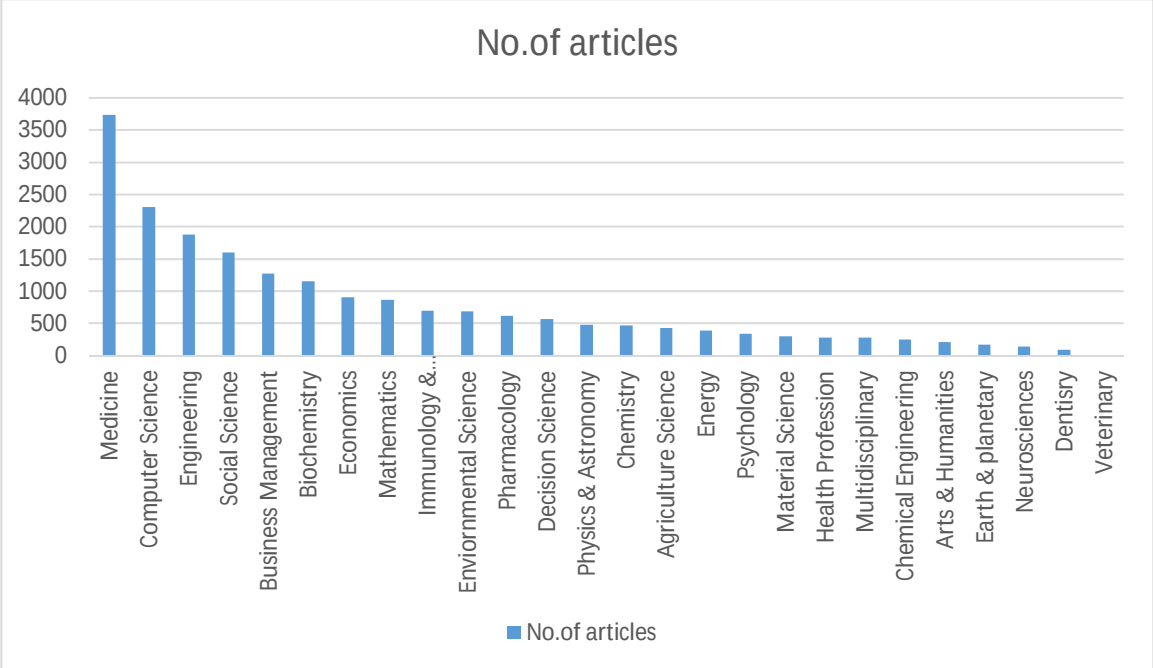

The importance of language in scholarly communication often varies across disciplines and over time. In the present study, English emerged as the dominant language, accounting for 10,569 publications, significantly surpassing other languages such as Spanish, French, and Russian. This dominance reflects the global role of English as the primary medium for scientific discourse, particularly in high-impact and widely indexed journals. An analysis of publication languages reveals a clear preference for English, largely because the majority of journals covering the subject are based in English-speaking countries or cater to an international readership. Consequently, English continues to overshadow other languages in the dissemination of research related to COVID-19.

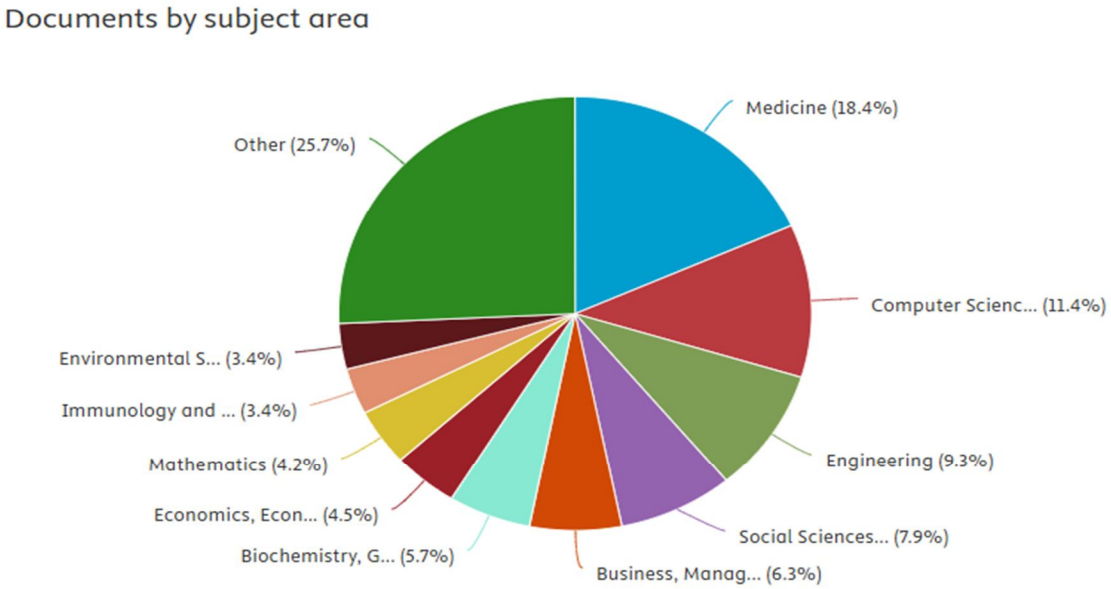
*E. Distribution of Articles According to Subject Area*

| Sr.No. | Subject Area | No.of articles | Percentage |
|---|---|---|---|
| 1. | Medicine | 3736 | 18.37 |
| 2. | Computer Science | 2309 | 11.35 |
| 3. | Engineering | 1882 | 9.25 |
| 4. | Social Sciences | 1599 | 7.86 |
| 5. | Business management | 1277 | 6.28 |
| 6. | Biochemistry | 1152 | 5.66 |
| 7. | Economics | 907 | 4.46 |
| 8. | Mathematics | 862 | 4.24 |
| 9. | Immunology & | 697 | 3.43 |

| | | | |
|---|---|---|---|
| | Microbiology | | |
| 10. | Environmental Science | 688 | 3.38 |
| 11. | Pharmacology, Toxicology | 620 | 3.05 |
| 12. | Decision Science | 572 | 2.81 |
| 13. | Physics & Astronomy | 481 | 2.36 |
| 14. | Chemistry | 466 | 2.29 |
| 15. | Agricultural & Biological Sciences | 429 | 2.11 |
| 16. | Energy | 387 | 1.90 |
| 17. | Psychology | 343 | 1.69 |
| 18. | Material Science | 298 | 1.47 |
| 19. | Health Profession | 284 | 1.40 |
| 20. | Multidisciplinary | 275 | 1.35 |
| 21. | Chemical Engineering | 247 | 1.21 |
| 22. | Arts & Humanities | 210 | 1.03 |
| 23. | Earth & Planetary Sciences | 169 | 0.83 |
| 24. | Neurosciences | 140 | 0.69 |
| 25. | Dentistry | 87 | 0.43 |
| 26. | Veterinary | 56 | 0.28 |
| Total | | 20,339 | 3.81 |

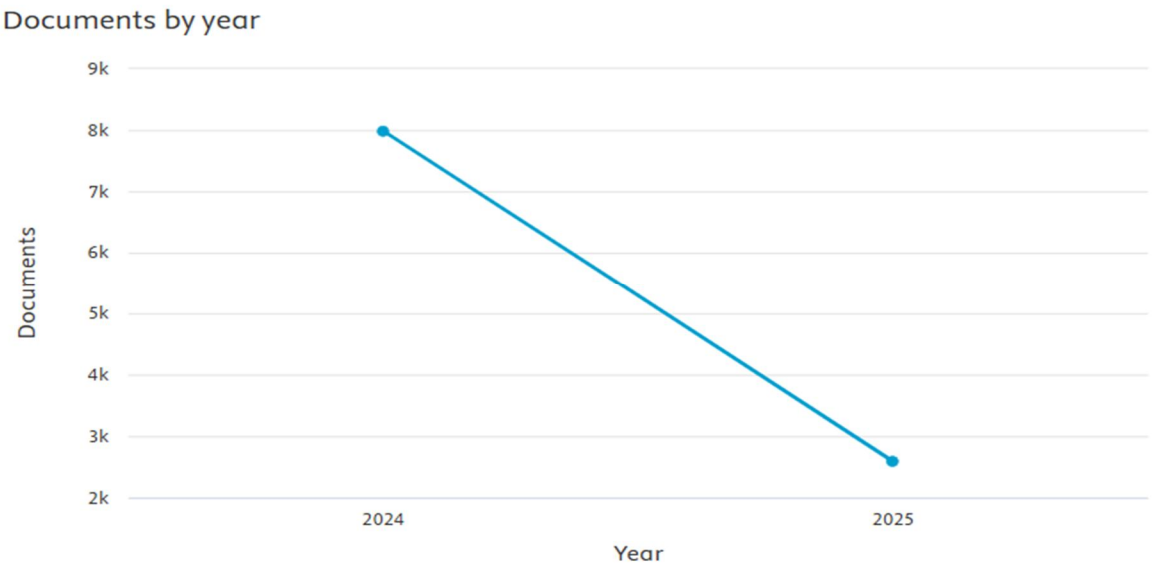
Table 1 and Figure 1 present the distribution of 10,572 research articles across 26 subject areas. The data reveals that Medicine is the most prominent field, accounting for 3,736 articles (35.31%), highlighting its central role in COVID-19-related research. This is followed by Computer Science, which contributed 2,309 articles (21.84%), reflecting the growing intersection between technology and healthcare in pandemic response efforts. At the other end of the spectrum, Veterinary Science recorded the lowest contribution, with only 56 articles (0.53**%)**. This distribution underscores the interdisciplinary nature of COVID-19 research, while also illustrating the dominance of medical and technological domains.





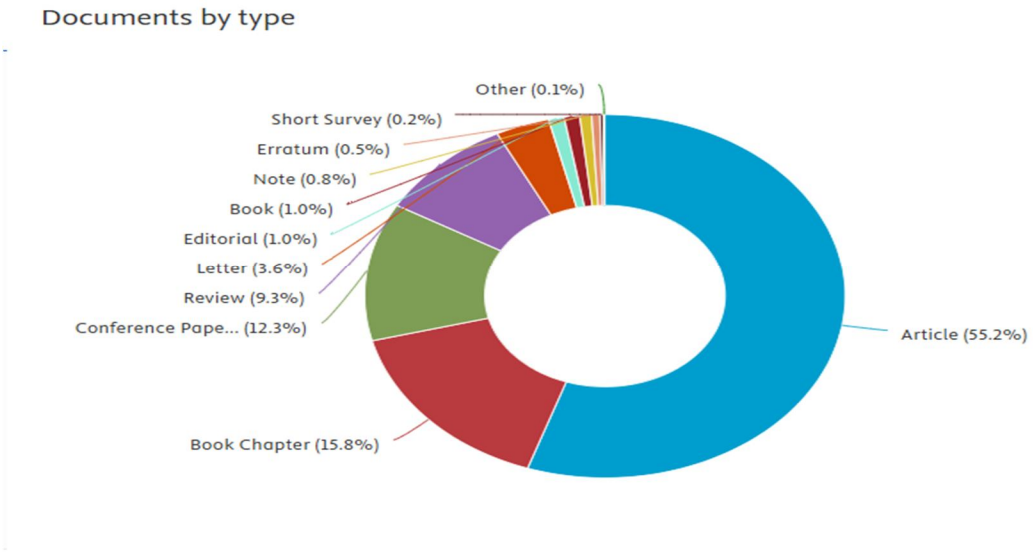

*F. Distribution of Articles by Year*

| Year | Article |
|---|---|
| 2024 | 7982 |
| 2025 | 2590 |
| Total | 10,572 |



*G. Document by Type*

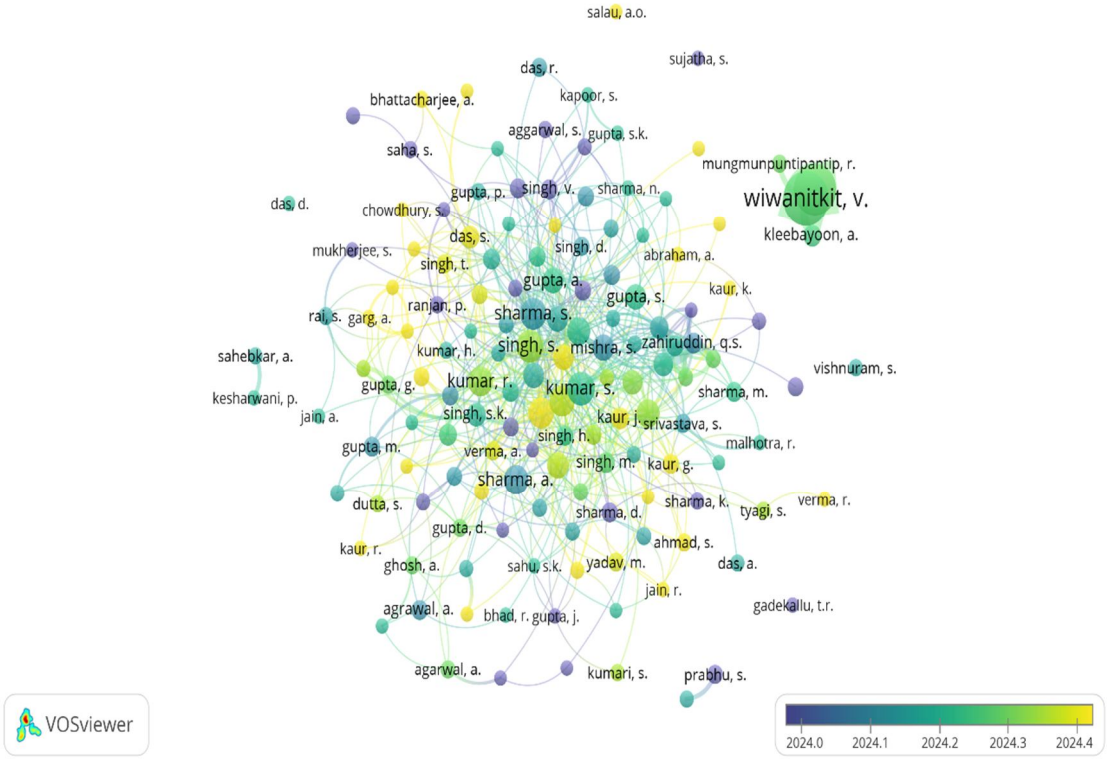
| | |
|---|---|
| Article | 5839 |
| Book Chapter | 1668 |
| Conference Paper | 1304 |
| Review | 980 |
| Letter | 383 |
| Editorial | 111 |
| Book | 110 |
| Note | 84 |
| Erratum | 58 |
| Short Survey | 25 |
| Retracted | 6 |
| Data Paper | 4 |




*H. Authorship Pattern*

| Sr.No. | No.of authors | No.of articles | Total no. of authors | % of articles | % of authors | Cum. % of articles |
|---|---|---|---|---|---|---|
| 1 | Single | 17 | 17 | 1.7 | 0.43 | 1.7 |
| 2 | Two | 169 | 338 | 16.9 | 8.48 | 18.6 |
| 3 | Three | 147 | 441 | 14.7 | 11.07 | 33.3 |
| 4 | Four | 170 | 680 | 17.00 | 17.07 | 50.3 |
| 5 | Five | 132 | 660 | 13.2 | 16.57 | 63.5 |
| 6 | Six | 91 | 546 | 9.1 | 13.70 | 72.6 |
| 7 | Seven | 50 | 350 | 5.0 | 8.79 | 77.6 |
| 8 | Eight | 37 | 296 | 3.7 | 7.43 | 81.3 |
| 9 | Nine | 35 | 315 | 3.5 | 7.91 | 84.8 |
| 10 | Ten | 21 | 210 | 2.1 | 5.27 | 86.9 |
| 11 | More than 10 | 131 | 131 | 13.1 | 3.23 | 100 |
| Total | | 1000 | 3984 | 100 | 99.95 | |

The authorship pattern of the articles is presented in Table No.4. The study reveals that a total of 3984 authors have contributed to 1000 articles with different frequencies of authors. Table No. 4 shows the authorship pattern of articles. Among 1000 articles, 17 (1.70%) articles are written by a single author, 169 (16.9%) articles are written by two authors, 147 (14.7%) articles are written by three authors, 170 (17%) articles are written by three and 131 (13.1%) articles are written by more than 10 authors. It can be seen that four authors are predominant, rather than multiple authors. The authorship pattern reveals a remarkable difference between the number of single authors and multiple authors. A very small number of articles are written by multiple authors. The study reveals that single-authorship research is predominant compared to information technology in LISA. The study opined that team research is favoured in Information Technology in LISA.(Khaparde & Pawar, 2013)




*I. Degree of Collaboration*

The degree of collaboration among authors is a vital indicator of research dynamics and teamwork within the scientific community. In the present study, the degree of collaboration was calculated using the formula proposed by Subramanyam (1983):

C = Nm / (Nm + Ns)

Where:

*C* = Degree of collaboration

*Nm* = Number of multi-authored papers

*Ns* = Number of single-authored papers

Out of the 1,000 articles analyzed, 17 were single-authored (Ns) and 983 were multi-authored (Nm). Using the formula:

C = 983 / (983 + 17) = 0.983

The resulting degree of collaboration is 0.983, which indicates a very high level of collaborative authorship in COVID-19 research. This reflects the multidisciplinary nature of pandemic-related studies and the necessity for researchers across various fields and institutions to work collectively in addressing complex global health challenges

Top Ten highly cited authors

| Sr.No. | Impacted authors | Name of Publication | Total citations till June 2025 |
|---|---|---|---|
| 1 | Ferrari, A.J., Santomauro, D.F. et al. | Lancet | 1316 |
| 2 | Naghavi, M., Ong, K.L. et al. | Lancet | 791 |
| 3 | Brauer, M., Roth, G.A.et al. | Lancet | 760 |
| 4 | Steinmetz, J.D., Cousin, E et al | ancet Neurology, | 559 |
| 5 | Schumacher, A.E., Kyu, H.H. et al | Lancet | 341 |
| 6 | Vats, S., Sharma, V. et al | Expert Systems with Applications | 297 |
| 7 | Vollset, S.E., Ahlstrom, A.J. et al | Lancet | 286 |
| 8 | Feigin, V.L., Nair, S. et al | Lancet Neurology | 198 |
| 9 | Sharma, R., Shishodia, A. et al | International Journal of Logistics Research and Applications | 190 |
| 10. | Passaro, A., Wang, J. et al | Annals of Oncology | 188 |

Top Ten Highly Cited COVID-19 Articles

| Sr.No. | Name of the article | Main Authors | Name of Journal | Year | Total citations till June 2025 |
|---|---|---|---|---|---|
| 1. | Global incidence, prevalence, years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) for 371 diseases and injuries in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021.(Ferrari et al., 2024) | Ferrari, A.J., Santomauro, D.F. et al. | Lancet | 2024 | 1316 |
| 2. | Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021.(Naghavi et al., 2024) | Naghavi, M., Ong, K.L. et al. | Lancet | 2024 | 791 |
| 3. | Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021.(Brauer et al., 2024) | Brauer, M., Roth, G.A.et al. | Lancet | 2024 | 760 |
| 4. | Global, regional, and national burden of disorders affecting the nervous system, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021.(Steinmetz et al., 2024) | Steinmetz, J.D., Cousin, E et al | Lancet Neurology | 2024 | 559 |
| 5. | Global age-sex-specific mortality, life expectancy, and population estimates in 204 countries and territories and 811 subnational locations, 1950–2021, and the impact of the COVID-19 pandemic: a comprehensive demographic analysis for the Global Burden of Disease Study | Schumacher, A.E., Kyu, H.H. et al | Lancet | 2024 | 341 |

| | | | | | |
|---|---|---|---|---|---|
| | 2021.(Schumacher et al., 2024) | | | | |
| 6. | Iterative enhancement fusion-based cascaded model for detection and localization of multiple disease from CXR-Images.(Vats et al., 2024) | Vats, S., Sharma, V. et al | Expert Systems with Applications | 2024 | 297 |
| 7. | Burden of disease scenarios for 204 countries and territories, 2022–2050: a forecasting analysis for the Global Burden of Disease Study 2021.(Vollset et al., 2024) | Vollset, S.E., Ahlstrom, A.J. et al | Lancet | 2024 | 286 |
| 8. | Global, regional, and national burden of stroke and its risk factors, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021.(Feigin et al., 2024) | Feigin, V.L., Nair, S. et al | Lancet Neurology | 2024 | 198 |
| 9. | Agriculture supply chain risks and COVID-19: mitigation strategies and implications for practitioners.(Sharma et al., 2024) | Sharma, R., Shishodia, A. et al | International Journal of Logistics Research and Applications | 2024 | 190 |
| 10. | Amivantamab plus chemotherapy with and without lazertinib in EGFR-mutant advanced NSCLC after disease progression on osimertinib: primary results from the phase III MARIPOSA-2 study.(Passaro et al., 2024) | Passaro, A., Wang, J. et al | Annals of Oncology | 2024 | 188 |

## V. FINDINGS

The bibliometric assessment of 10,572 research articles related to COVID-19 associated with Indian institutions (2024–2025) uncovers the following significant findings:

*1)* Elevated Collaboration Frequency: A large proportion (98.3%) of the examined articles were written by multiple authors, leading to a notable level of collaboration (0.983), which reflects a robust culture of collaborative research throughout the pandemic.

*2)* Prevalence of the English Language: English served as the main language for scholarly communication, comprising 99.97% of publications, solidifying its role as the universal language of international science.

*3)* Top Productive Subject Areas: The area of Medicine dominated with 3,736 articles (35.31%), followed closely by Computer Science (21.84%) and Engineering (17.79%), highlighting the interdisciplinary influence of COVID-19 studies.

*4)* Prominent Organizations: The leading contributors were Saveetha Institute of Medical and Technical Sciences, Amity University, and Chandigarh University, showcasing institutional excellence in pandemic research.

*5)* Trends in Authorship: Papers with four authors were the most prevalent at 17%, while those with over ten authors made up a significant 13.1%, reflecting a tendency towards extensive collaborative groups.

*6)* Prolific Writers: Wiwanitkit V. and Daungsupawong H. were the most prolific authors, whereas Chakraborty C. and Khatib M.N. achieved the greatest citation influence.

*7)* Frequently Referenced Works: The most frequently referenced papers appeared in prestigious journals like The Lancet and Lancet Neurology, frequently involving international collaborations and tackling the worldwide burden of illness and public health indicators.

*8)* Types of Documents: The most prevalent form of publication was articles (55.2%), with book chapters (15.8%) and conference papers (12.3%) following, highlighting various ways of sharing information.

*9)* Year-wise Distribution: Research output reached its highest point in 2024 with 7,982 publications, showcasing immediate post-pandemic research efforts, whereas 2025 recorded 2,590 publications, signifying ongoing but decreasing interest.

## VI. CONCLUSION

This bibliometric study emphasises the evolving nature of Indian COVID-19 research in 2024–2025. The results emphasize a clear inclination toward cooperative, multidisciplinary research, with Medicine and Computer Science identified as key fields. The significant level of collaboration showcases a developing research culture in India that prioritizes teamwork, collective resources, and collaborative problem-solving to tackle intricate global health challenges.

Additionally, the research highlights the primary importance of English, the concentration of academic output in a limited number of leading institutions, and the considerable impact of highly referenced authors and articles featured in prestigious journals. The observed temporal and thematic patterns serve as a guide for understanding how Indian researchers responded to a global crisis and how academic communication evolved during this period.

These findings provide important direction for policymakers, funding bodies, and educational institutions in developing future research priorities, promoting global collaboration, and increasing the visibility and influence of Indian science on the world stage.

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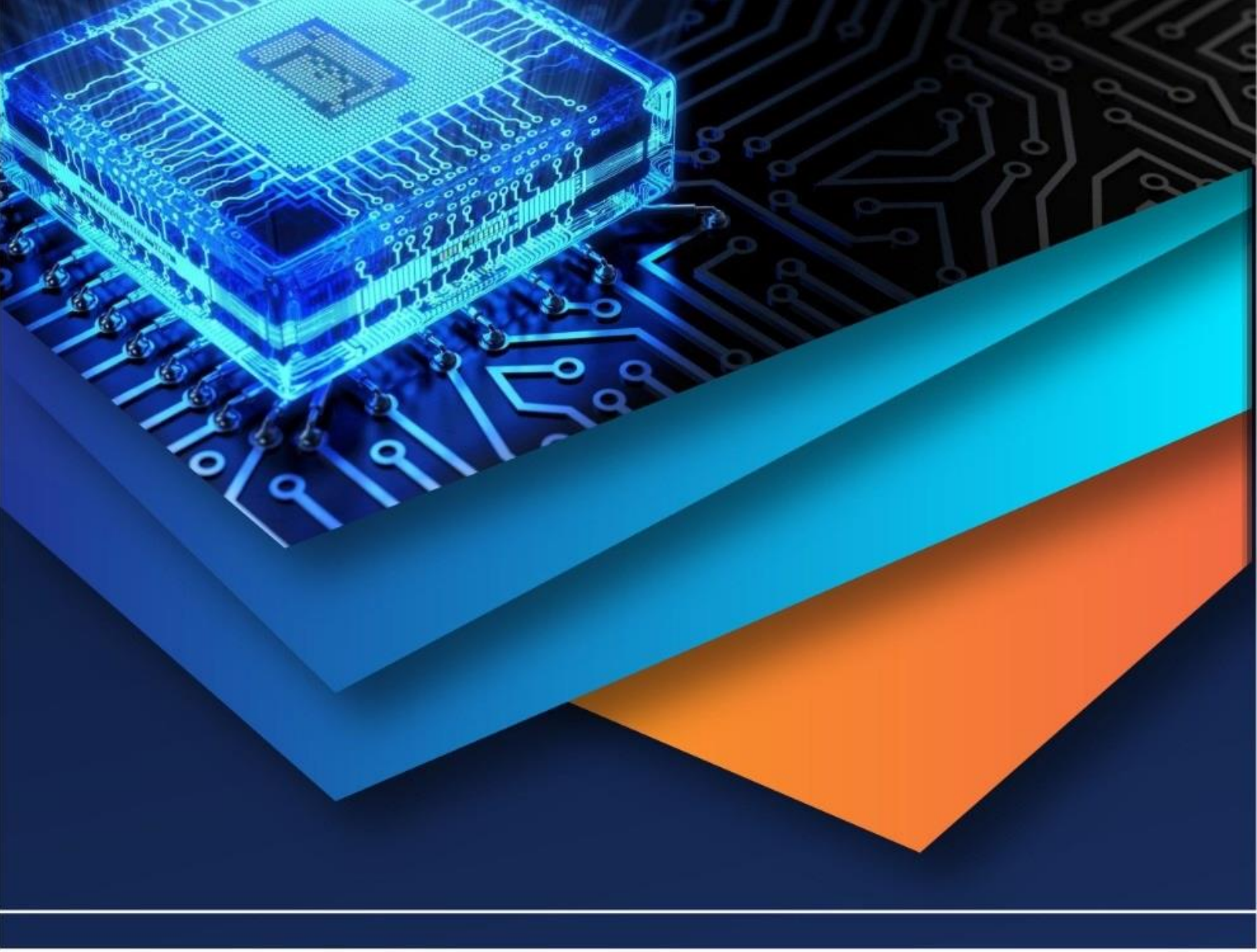

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